

# BLINDING SPEED EQUALS COMPETITIVE ADVANTAGE

*G. Dean Clubb*

Texas Instruments Defense Systems & Electronics Group has actions underway to achieve a precipitous reduction in the time now required to design, develop, and manufacture products that meet customer needs. The customer's No. 1 priority is to receive a quality product at the lowest price. So why is Defense Systems and Electronics Group focusing on cycle time? One might ask, "How does TI's vision of reducing cycle time meet the customer's need for a high quality, low-cost product?" The answer reminds us of the geometry lesson, "The shortest distance and most efficient path between two points is a straight line."

**"C**ycle Time!" What does this mean? As the pace of the world quickens, the value of being first to market with innovative solutions is the key to true competitive advantage. This is true in the commercial marketplace and it is also true in the military market.

Consider the lessons of Desert Storm. Texas Instruments (TI) was fortunate enough to participate in the GBU-28 Bunker Buster Program. A new system was needed to deal with deeply buried command and control bunkers that were beyond the reach of existing systems. The need was great, the time was short, and the only solution was to innovate a solution in an unprecedented short period of time. A team of government and industry people came together sharing the common

objective of solving a difficult technical challenge in a breakneck race against time. Personal interests were set aside as were traditional approaches, with long hours being the norm. The team worked to trade time against everything (cost, risk, performance). Reuse of existing subsystems offered the only answer. However, the pieces would have to be integrated in a very innovative way to achieve the desired results.

The result was the GBU-28 Bunker Buster that was conceived, developed, tested, and deployed in approximately 28 days. This was less time than had ever been dreamed possible. The mission was accomplished and the GBU-28 played a significant role in the ending of the war. It was certainly not the only factor, but the fact that Iraq surrendered one day after the system destroyed a deep command bun-

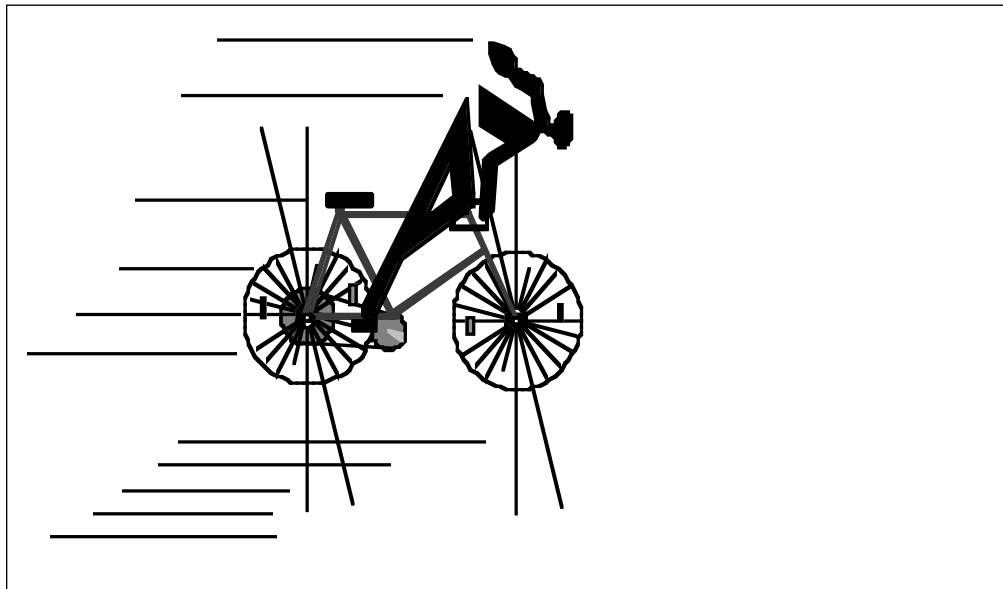


Figure 1. "Cycle Time"

ker was probably not a coincidence. The entire effort made a difference and the reason was *time—blinding fast cycle time*. The system performed when it was needed but there were also other benefits: the cost was low because the entire effort was accomplished in such a short period. Also, the quality and reliability was high because it was made of existing proven sub-assemblies. A common thread emerges when this experience is compared with other similar ones: If you can drive down cycle time, cost and quality will improve. So the bottom line is that *time is a pre-*

*cious commodity and has value*—it is true every time a new product arrives well in advance of the competition.

Wasted motion is expensive, compromises quality, and results in noncompetitive products and services. The result is that instead of giving the customer a competitive advantage, the wasted motion actually results in customer dissatisfaction. Achieving customer satisfaction will dictate company survival. The companies that meet their customers' needs of low cost and high quality will be the companies that maintain prominence. Cycle time, speed,

Dean Clubb is President of the Defense Systems Electronics Group, and corporate Executive Vice-President of Texas Instruments (TI). He is a member of the Defense Science Board, and American Defense Preparedness Association Board of Directors. His organizational unit was awarded the Malcolm Baldrige National Quality Award in 1992. Prior to his current position, he helped to develop the STRIKE and HARPOON missiles. He also managed and directed the HARM program at TI. He is a graduate of the University of Missouri with BS degrees in Mechanical and Aeronautical Engineering.

and improvement methodology is the key in fulfilling customer needs. Michael Porter of the Harvard Business School, quoted in a recent *Wall Street Journal* article by William M. Bulkeley says, “Speed has become crucial to getting ahead internationally. It’s gone from a game of resources to a game of rate-of-progress.” He says, “Competition today is a race to improve.” In his article he quotes Kim Sheridan, chairman of Avalon Software Inc., a Tucson, AZ, maker of software, by saying: “It’s not the big companies that eat the small: It’s the fast that eat the slow.” The benefits of speed are becoming more and more recognized by companies in America and throughout the world.

In order to meet critical customer needs of reduced cost and improved quality, they realized a key methodology in achieving these demands lies in properly reducing cycle time. By evaluating a process, unrequired tasks can be identified and removed. Some examples of the tasks that are undesirable are audits, inspections, handoffs, signature approvals, to name a few. These tasks would be identified as wasteful steps, non-value-added curves in a road or deviations in a straight line path. In other words straighten out the curves from point A to point B.

Merely performing the same process steps faster—applying automation, employee overtime, or extended shifts, to mention a few of traditional methodologies—do not reduce cost or improve quality. These actions in fact drive up overhead, add cost, and do little to address our customers’ real needs. The same curves are in the road.

Although this methodology may produce products faster, it overlooks other key competitive ingredients of cost and qual-

ity. Cycle time improvements, utilizing the proper methodology, will have a positive impact on cost and quality. Eliyahu M. Goldratt states in his book *The Goal* that when applying the theory of constraints, one always must evaluate critical path items and perform the tradeoffs that best meet customer needs. Be very careful to seek process improvements that have a favorable impact on cycle time, quality, and cost.

For example, if one seeks a solution that gets us quality at a higher cost, it is not a competitive solution (it may require additional capital, more inspections, stretching cycle time, etc.). Or, if one arbitrarily reduces cycle time (i.e., stops inspection without improving the process) then poor quality will be passed to the customer.

Both situations will increase cost or loss of customer confidence.

Using the proper methodology will favorably effect speed, cost, and quality. The proper methodology encompasses all phases of the product need: customer needs (teaming), and manufacturability, teaming with all skills of the process:

- standardization,
- material,
- processes,
- simplicity of design, reduction of part numbers to a minimum,
- reusability,
- reuse of existing designs,
- reuse of existing manufacturing processes,

- reuse of existing test equipment,
- reuse of existing documentation and plans,
- supplier involvement and teaming at the earliest point of product, and
- combine tasks and removal of handoffs

Texas Instruments is striving to maximize design standardization and strictly adhering to the integration of these processes into all product development phases. Greater emphasis is also being

placed on design for manufacturing capabilities. After all, if a product is not going to be produced and used by a customer why develop it in the first place? Development should encompass all phases of the product need.

When applying the proper methodology to existing processes one must first truly understand the existing process. Mapping the current process is critical in identifying all the curves in the road. Arrive at an understanding of why a process either needs the curves, because of current design, or establish the reason for removing the curves from the process. Process standardization will enhance cycles of learning. Companies that have a well-

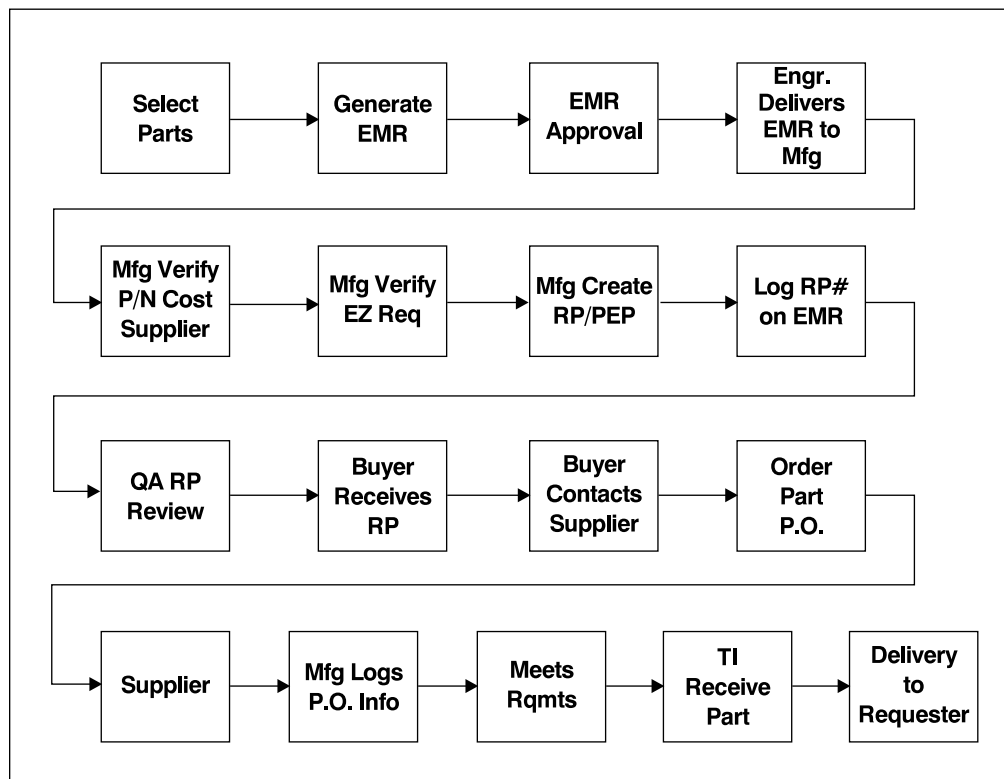


Figure 2. Engineering and MRO Material Purchasing

integrated design standardization focus will tend to have higher value-added processes. The processes will be simpler, thus reducing variation (higher quality). In other words, processes which require individual “heroics” have a greater number of curves, higher rate of variation (lower quality). Companies that have a well-integrated design standardization focus will have fewer processes, but the processes will be well understood and will be much more effective in meeting the customers needs. Processes that are determined to be best in class will be used and are improved over time.

Figure 2 shows a real-life example of redesigning a process with an emphasis

on cycle time. The figure illustrates the process of ordering maintenance, repair, operational and engineering material. The process consisted of seventeen steps. The cost was \$103 per transaction and required a cycle time of four to six weeks. Upon reviewing the process it was determined that only four steps were required to meet customer needs. Figure 3 shows the revised process with only the necessary steps. The revised process demonstrates a cycle time for engineering material of three to eight days. Maintenance, repair, and operational material currently has a cycle time of one day. Transaction costs have been reduced to less than \$5 per transaction. The quality level consistently

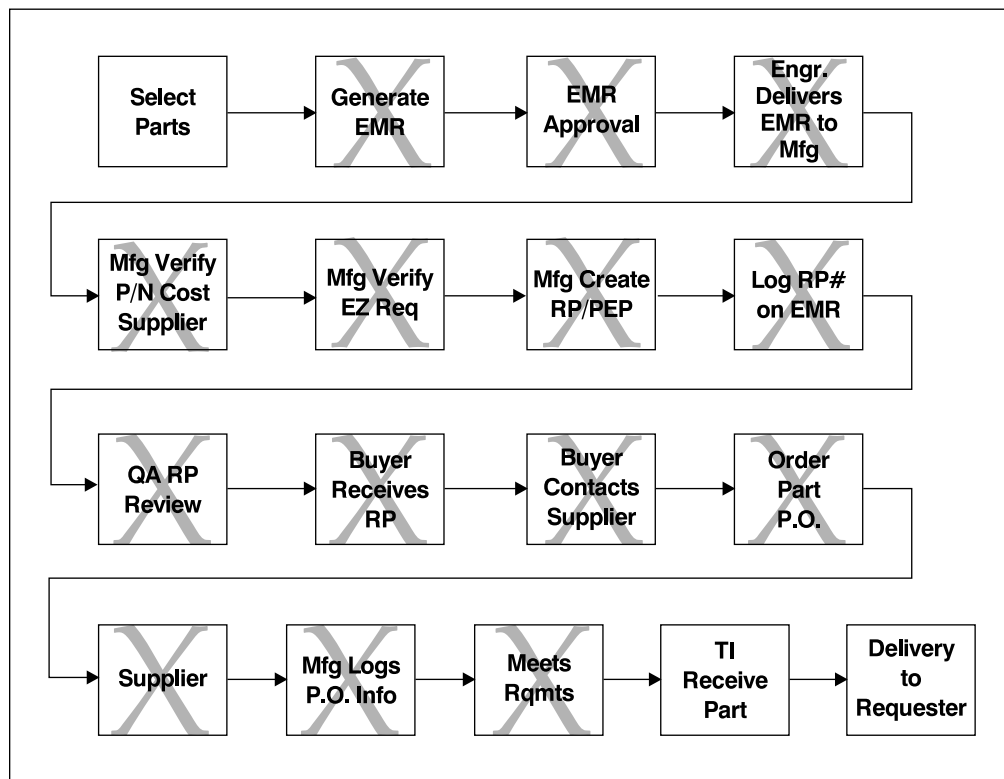


Figure 3. Express Buy Process

maintains 6 sigma.

The concept is relatively simple; remove the inefficient process steps and keep the steps that are only absolutely required (value-added steps). Value added steps are defined as steps the customer is willing to pay for. Since processes don't start and stop neatly at functional boundaries, the process usually never gets optimized. In fact, by optimizing a given function the process can, in many cases, degrade or become suboptimized.

In order to effectively reduce cycle time, complete processes have to be reviewed, not just functions. Typically, businesses are organized around functions. This is called a hierarchical functional organization. Functional organizations work to optimize a functional expertise. The entire recognition and reward structure is designed around creating this behavior. In today's environment of speed, this bureaucratic culture is not conducive to the behavior required for incremental, fast, dynamic, ongoing change required by today's customer.

Industry is attacking this hierarchical culture by introducing teaming concepts. These concepts are designed to give businesses a process focus. The teaming models are designed to break down traditional organizational boundaries and remold these functions into skills that are required by the process. These models obviously attack the heart and soul of traditional

management practices. Moving a company from a functional improvement model to a process improvement model is a key in reducing the wasted motion involved in producing a product. Obtaining the corporate environment that will enable diverse, highly skilled people to focus on establishing and improving processes that will produce products that truly meet customer needs is vital.

Great athletic teams perform with flawless precision, very little wasted motion, and few mistakes, and they continue to exceed records of past performance. Industry, by better applying teaming dynamics to harness the workforce when they apply the proper cycle time methodology, can lift customer satisfaction to a new all time high. The teaming business of the future must learn to relish change, question everything, think outside the box, and never stop learning. Work to master the dynamics of creating a culture advantageous to teaming and empowerment. The successful company must want customers to be embarrassed to even think about doing business with someone else.

Time is a precious commodity and has value. It is there every time a new product arrives well in advance of the competition. Applying the correct methodology of cycle time, cost, and quality is key to customer satisfaction and product success. The bottom line is—*blinding speed equals competitive advantage!*